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INSTINCT AND INTELLIGENCE.

BY

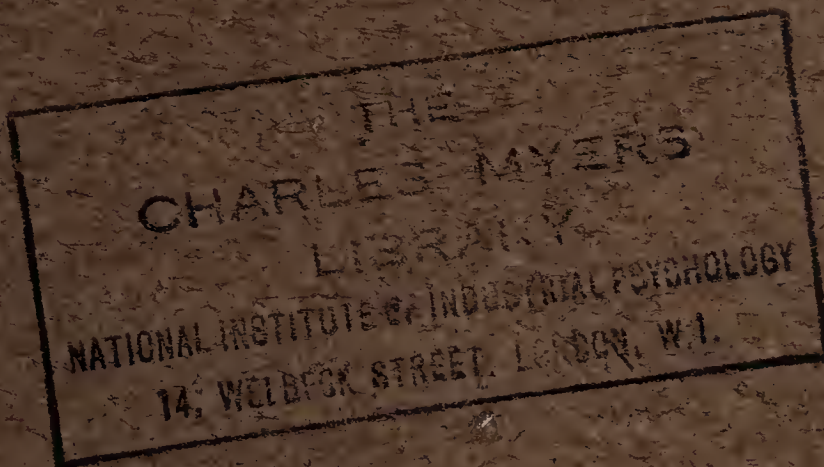
CHARLES S. MYERS.

INSTINCT AND INTELLIGENCE—A REPLY.

BY

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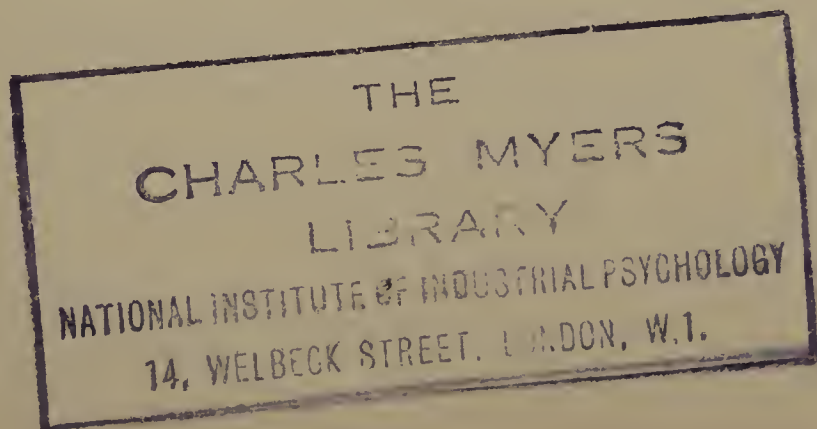
I. INSTINCT AND INTELLIGENCE¹.

BY CHARLES S. MYERS.

The writer's standpoint stated.—Criticism of the accepted differences between instinct and intelligence.—Rudiments of conation and meaning in instincts.—The plasticity of instincts.—Examination of the difficulties of enumerating human instincts.—Human and animal intelligence.—Instinct and intelligence from the aspect of evolution.—General conclusion.

INSTINCT and intelligence are generally regarded as two distinct modes of mental activity. In the following paper I hope to give adequate reasons for abandoning this view. I shall endeavour to show that instinct and intelligence are everywhere inseparable, and that in every so-called instinctive or intelligent act, a concomitant aspect of intelligence or instinct may be obtained. I regard the separation of instinct and intelligence as a purely artificial act of abstraction—convenient, no doubt, for the purposes of psychological science, but resulting merely from regarding mental behaviour from two different points of view. I conceive the relation of instinct and intelligence to be essentially similar to that of object to subject. So far as instinctive behaviour can be regarded from the standpoint of the individual experience of the organism, it appears, however imperfectly, as “intelligent,”—characterised by finalism. So far as intelligent behaviour can be regarded from the standpoint of observing the conduct of other organisms, it appears, however imperfectly, as “instinctive,”—characterised by mechanism. Thus intelligence and instinct, choice and tropism, finalism and mechanism, are equally true and valid; they are our necessarily “anthropo-psychic” interpretations of one and the same problem regarded from different standpoints.

¹ This paper formed part of a symposium on the subject held at a joint meeting of the Aristotelian and British Psychological Societies and of the *Mind* Association in London in July, 1910.



It is universally admitted that intelligence and instinct are distinguished from each other by two principal characters. One of these consists in consciousness or unconsciousness of end, the other in plasticity or fixity of reaction. The common assumptions are (1) that in typically instinctive behaviour the organism is wholly unaware of the end thereby to be attained, and (2) that such behaviour is unalterable and from the very outset perfect. It appears to me that neither of these criteria is altogether satisfactory.

I shall begin by considering the instincts of animals, treating them first from the psychical or subjective aspect. The old view that instincts are merely "complex reflexes" dies hard. Even Professor Lloyd Morgan, if I understand him correctly, hesitates to relinquish it. He has described the consciousness that is involved in a chick's *first* peck at food as consequent on the act, not as simultaneous with it. "On this one occasion the accompanying consciousness arises wholly by backstroke¹." And quite recently he has expressed his belief that all a moorhen chick experiences when swimming for the first time is "a specific presentation, a specific response, a specific emotional tone, all coalescent into one felt situation²." Now surely, even on the very first occasion of the functioning of an instinct, there is something more than this, something which distinguishes an instinct from a reflex. As Mr McDougall rightly insists, every instinct has its "conative aspect³"; in other words, it is accompanied by a feeling of activity. We cannot, I think, doubt the existence of this "aspect" or "feeling," nor can we derive it, as I understand Professor Lloyd Morgan to do, from afferent impulses of visceral origin⁴. (In this place it is obviously impossible to criticise the modern efforts to reduce the conative and affective elements of consciousness to the sensational element. These attempts end logically in some such position as Professor Titchener's, that conation is a "pretender" as a conscious element, and that affection is merely sensation at a lower stage of mental development⁵. I cannot expect those who adopt such an attitude to follow me further.)

But there is even more than this "feeling of activity" at the very first performance of an instinct. There is another element, which, so far as I am aware, has hitherto been completely ignored. To my mind

¹ *Habit and Instinct*, London, 1896, p. 135.

² *Brit. Journ. Psych.* 1909, Vol. III. p. 13.

³ *An Introduction to Social Psychology*, London, 1908, p. 26.

⁴ *Ibid.* pp. 137, 139, 140.

⁵ *A Text-book of Psychology*, New York, 1909, Part I. pp. 49, 261.

it is certain that, on the occasion of the chick's first peck or the duckling's first swim, the bird is dimly, of course very dimly, conscious of the way in which it is about to act. I believe this, because no organism can ever execute a new movement which does not involve other movements that have been performed previously. A completely new movement is as impossible as a completely new thought. When a chick first attempts to peck, many of the muscles then called into action must have been contracted before. Thus the feeling of activity arising on the occasion of a chick's first peck is not altogether a new one. It is related, as each of our own experiences is related, to past experiences. And the very vague awareness of results which is associated with those previous feelings of activity gives the chick a vague awareness of the result of its first peck, *before* it has actually performed the action. Such awareness is, of course, rudimentary in the extreme. The chick or duckling cannot then—or indeed ever—be aware of the aims of its instincts, as we are aware of them. But it is important to note what rudimentary consciousness of this kind exists, and to realize that it is the embryonic representative of meaning.

The question arises—are instincts of all kinds and in all circumstances characterized by these rudiments of conation and meaning? I think that they are absent under two conditions only, first, if the instinct has been repeated sufficiently often; secondly, if the instinct is from the first unalterable by later experience. But I would suggest that the same word instinct cannot be suitably employed to embrace, in addition, either of these conditions. For from the standpoint of individual experience, the first few times of performance of an instinct must be very different from the thousandth time of performance; the instinct has become a "habit." And an instinct which is from the first unalterable is, as I shall immediately urge, nothing but a reflex.

Having attempted to show that the subjective aspects of so-called instinctive and intelligent behaviour differ in degree and not in kind, I turn now to consider the alleged difference in their objective aspects,—the fixity of instinct, the plasticity of intelligence.

An instinct has been defined as "a complicated reaction that is perfect the very first time¹." I question whether this is ever literally the case, if only the reaction could be submitted to close enough examination. Young birds usually learn to fly and to sing by imitating their elders. Even the young of ants, where "instinct" is considered

¹ H. Driesch, *The Science and Philosophy of the Organism*. Gifford Lectures (Aberdeen), 1908, p. 110.

to reach its highest development, have been observed to learn by imitation from older ants¹. Instincts are almost always modifiable and perfected by later experience. Indeed, a "perfect reaction" is apt not to need subsequent modification. It can adequately be worked by mechanism. Consciousness, especially those elements of conation and meaning which we have just been considering, will become unnecessary, nay, must even prove disadvantageous. A reflex is the nearest example of such a condition. (But even a reflex proves to be not "absolutely" fixed, and may prove to be not "absolutely" unconscious. All that can be said is that its central consciousness, if present, is always a *terra incognita*, never communicable to the Ego of the organism.) From the point of view of definition, it would be better to call the flight of moths towards a lamp a reflex, not an instinct; no amount of experience alters the reaction.

Nor do different individuals of the same species or the same individuals on different occasions show that uniformity of action, which has been often regarded as characteristic of instincts. Take, for instance, the following observations by Mr and Mrs Peckham on the habits of solitary wasps, which, with some of his remarks, I quote from Professor Hobhouse².

"When the provisioning is completed the time arrives for the final closing of the nest, and in this, as in all the processes of *Ammophila*, the character of the work differs with the individual. For example, of two wasps that we saw close their nests on the same day, one wedged two or three pellets into the top of the hole, kicked in a little dust and then smoothed the surface over, finishing it all within five minutes. This one seemed possessed by a spirit of hurry and bustle, and did not believe in spending time on non-essentials. The other, on the contrary, was an artist, an idealist. She worked for an hour, first filling the neck of the burrow with fine earth which was jammed down with much energy, this part of the work being accompanied by a loud and cheerful humming, and next arranging the surface of the ground with scrupulous care and sweeping every particle of dust to a distance. Even then she was not satisfied, but went scampering around hunting for some fitting object to crown the whole. First she tried to drag a withered leaf to the spot, but the long stem

¹ E. Wasmann, *Comparative Studies in the Psychology of Ants and of Higher Animals* (Eng. trans.). St Louis, 1905, p. 68. Cf. also Lloyd Morgan, *op. cit.* p. 131.

² *Mind in Evolution*, London, 1901, pp. 68, 70. Cf. also G. W. and E. G. Peckham, *Wasps Social and Solitary*, Boston, 1905.

stuck in the ground and embarrassed her. Relinquishing this, she ran along a branch of the plant under which she was working, and, leaning over, picked up, from the ground below a good sized stone, but the effort was too much for her, and she turned a somersault on to the ground. She then started to bring a large lump of earth, but this evidently did not come up to her ideal, for she dropped it after a moment, and, seizing another dry leaf, carried it successfully to the spot and placed it directly over the seat.' . . .

" 'Presently she [in this instance a specimen of another species, *Pompilus scelestus*] went to look at her nest and seemed to be struck with a thought that had already occurred to us—that it was decidedly too small to hold the spider. Back she went for another survey of her bulky victim, measured it with her eye, without touching it, drew her conclusions, and at once returned to the nest and began to make it larger. We have several times seen wasps enlarge their holes when a trial had demonstrated that the spider would not go in, but this seemed a remarkably intelligent use of the comparative faculty.' "

" Whatever the correct interpretation of this last observation, enough has been said to show that these wasps adapt means to ends in a way suited to the individual occasion. They are by no means confined to a series of reactions evoked with mechanical uniformity by a uniform stimulus. On the contrary, they are able to deal within limits with each emergency presented by the individual differences of the prey they have captured. "

We have called attention (p. 211) to the fact that even ants are capable of learning from their elders. But this power of learning, or at all events of learning by experience, is by most psychologists considered a sign of intelligence¹. If so, the very humblest forms of animal life appear to be intelligent. The protozoon *Stentor*, for example, first reacts to a fall of powder by turning aside. Should this action not bring it beyond reach of the powder, it reverses the direction of its ciliary movement. If it still fails to be successful, it withdraws into its tube. Finally, if the fall of powder continues, the organism detaches itself from its support, and swims away to another. When, after a short interval, the fall of powder is repeated, the organism starts at once with the fourth reaction, instead of proceeding through the three previous stages which have proved ineffective².

It may be urged, however, that the essential objective features of

¹ Cf. M. F. Washburn, *The Animal Mind*, New York, 1908, p. 19.

² H. Jennings, *The Behaviour of Lower Organisms*, New York, 1906.

intelligence are "the novelty of the adjustment and the individuality displayed in these adjustments¹." But novel adjustments are observed where the influence of intelligence, as generally understood, would doubtless be disputed. Professor Forel brought back to Europe a number of Algerian ants, which build their nests with a wide entrance in their native country. In their European home these ants found that their quarters were continually infested with the common ant. So they set to work to close the wide entrance of their nest². Or again, a dung-beetle, rolling its dung-ball along the sand, finds itself in a hollow, the sides of which are too steep for the ball to be pushed up from below. So the beetle butts down the sand at one side "so as to produce an inclined plane of much less angle³." We are of course free to believe that in such cases there is no true "novelty of adjustment," that the mode of reaction was already innate in the organism, only waiting for the rare situation which might evoke it. But my contention is that such a belief, if adequately elastic, is as applicable to intelligent as to instinctive behaviour.

I will now indicate the position so far reached. Instead of defining instincts as "complex reactions which are perfect the very first time," I have endeavoured to show that they are all within very variable limits improvable by practice or by imitation, or are modifiable by changed conditions of environment. Further, in place of the usual definition of instincts as merely "fixed innate activities," I have maintained that the essential mental concomitants of instincts are the feeling of activity and a vague consciousness of the behaviour to be achieved. I would urge that the existence of these central factors proclaims the presence of intelligence throughout instinct, and that, as the organism becomes endowed with an increasingly larger number of mutually incompatible modes of reaction, the intelligent aspect apparently comes more and more to the fore while the instinctive aspect apparently recedes *pari passu* into the background.

It is proverbial that the ordinary person, if asked whether *man* has instincts, replies "No. The behaviour of animals is regulated by instinct. Man is moved by intelligence, by reason." With one accord, however, psychologists insist that such early human acts as suckling, crying, crawling and walking, are instincts, and that even later acts are of like nature, e.g. the "sexual instinct." Others add to this list enor-

¹ Lloyd Morgan, *Animal Life and Intelligence*, London, 1891, p. 458.

² *L'Année psychologique*. 2^e Année, 1895, p. 41. Cf. also Wasmann, *op. cit.* p. 142.

³ Lloyd Morgan, *ibid.* p. 368.

mously. In one book¹ I find enumerated the instincts of imitation, curiosity and play; the expressive, aesthetic, moral and religious instincts; the parental and social instincts; the collecting, constructive, destructive and fighting instincts. May we not complete the list by adding the instincts of thought, reason, intelligence?

This difficulty in delimiting the human instincts arises from the criteria employed. Evidently these are: (1) What instances of human behaviour are analogous to the recognized instincts in animal life, and (2) what lines of conduct are common to all, or to large numbers of, mankind? The criteria are hence objective. But in man, at least, there should be no difficulty in substituting a subjective criterion, thus avoiding the notorious errors of interpretation arising from the former method. It should be easy for man to be able to describe the difference which he himself experiences when acting instinctively and when acting intelligently.

Herein, I believe, is the root of the difficulty. Man is never aware that he is acting instinctively; and on this account he naturally denies instincts to himself and his fellows, while ascribing them to animals. When a mother sacrifices her life to save her child, does she recognize that she is acting instinctively or unintelligently? At the dawn of the sexual instinct,—or even earlier, say at the first exercise of the walking instinct,—can we be said to have any cue which informs us that we are not acting intelligently but instinctively? From our own introspection we can only answer negatively.

It may be urged, on the one hand, that the human organism, when acting instinctively, achieves "its end under the driving power of the instinctive impulse awakened within it²," bringing his intelligence to bear as best he may, so as to satisfy that end. But is this impulse *always* felt as such, and does it when present appreciably differ from other forms of impulse which would not generally be classed as instinctive? Stress, on the other hand, may be laid on the fact that "each of the principal instincts conditions . . . some one kind of emotional excitement, whose quality is specific or peculiar to it³." But instinct is not to be identified with emotion; the former is not the necessary or universal condition of the latter. Thus neither instinctive emotion nor instinctive impulse appears to help us in differentiating instinct from intelligence. And we reach the same conclusion in the

¹ E. A. Kirkpatrick, *The Fundamentals of Child Study*, New York, 1903.

² McDougall, *op. cit.* p. 40 (footnote).

³ *Ibid.* p. 47.

case of man as we have already reached in the case of animals, that instinct and intelligence are inseparable.

The difference between animal and human intelligence is at first sight, and by many, considered fundamental. One may argue as extremely as Father Wasmann, for example, that "intelligence . . . exclusively signifies the power to act with deliberation and self-consciousness," but that "animals have no intelligence at all. If they were gifted with a spiritual power of abstraction, it would necessarily be manifested in their outward actions, especially by the formation of an arbitrary phonetic or graphic language. Animals, however, have no language; hence they have no intelligence¹." According to this view, we separate human from animal intelligence and identify the latter with instinct. Now to discuss the relation of human and animal intelligence is obviously beyond the scope of this paper. At all events, in the present state of comparative psychology, a decision on the subject is impossible. My belief is that the difference between human and animal intelligence, great as it is, is one of degree rather than of kind. I believe that we may recognize in animal life occasional dim flashes of those higher "spiritual powers" which are in full flame in the human mind.

Lastly, there remains the consideration of instinct and intelligence from the broader standpoints of evolution and philosophy. Three different views of psychic evolution have been advanced, corresponding to the better known ones of somatic evolution. The first ascribes reflexes, and in the usual sense instincts, to the degradation of behaviour which has been intelligently, purposefully acquired in the ancestry of the organism. The second view also accepts the heredity of acquired mental "dispositions," but attributes their acquisition to the environment instead of to an all-wise intelligence. The third attributes psychic evolution to variations in the germ plasm which are preserved by natural selection. There is little or no evidence in favour of the first of these views. The second (a Lamarckian) view is still hotly disputed. Only the third (or Darwinian) view meets with definite acceptance among psychologists as among biologists. By its acceptance, however, we may appear to be giving ourselves up to a wholly mechanical interpretation of the evolution of mind. I have therefore attempted in conclusion to show that there is scope, as well as need, for the finalistic interpretation also.

¹ *Comparative Studies in the Psychology of Ants and of Higher Organisms* (Eng. trans.), St Louis, 1905, pp. iii, 198.

For each of these two interpretations is traceable to our experience of activity, finalism to our experience of subject-activity, mechanism to our experience of object-activity. Each of them, too, comes to be extended beyond its sphere of origin. We extend the mechanistic interpretation to ourselves when we recognize that if all the conditions determining our behaviour were but given, one result and no other could issue therefrom, and that if only we could know all those conditions and had already observed their result, we could confidently predict the resulting behaviour. Such admissions do not conflict with our recognition that very often our actions cannot thus be predicted, that they are devised to attain ends, and that those ends are of our own making. This two-fold interpretation of his behaviour each of us recognizes within himself. He extends it also to his fellow-men. The question arises whether he is justified in extending it also to the behaviour and the evolution of living and lifeless objects generally.

From one point of view, certainly, we cannot avoid applying the finalistic interpretation to these objects, inasmuch as without it nature would be meaningless. We have just insisted that mechanism can only predict the result of given conditions, provided that a like result of like conditions has been observed already. Without previous experience, mechanism could never foretell that hydrogen and oxygen would yield water. It can never foretell the apparent discontinuities in evolution or the paths of history. Further, mechanism has no concern with ends, yet our mind finds evidence of finalism everywhere. Each piece of behaviour appears adapted for an end. Ends appear already framed in organisms which have no apparent power of framing ends for themselves.

We find that the non-nervous tissues of living objects are often possessed of a variety of methods, any one of which will serve to reach one and the same end, in cases, for example, of injury after which regeneration starts in one of several possible methods to reach one and the same result¹. It is indeed in the degree of adaptability to all possible disturbances that the psychical is distinguished from the non-psychical, the physiological from the physical, and, we may add, the entire Universe from that pure abstraction,—purposeless mechanism. For ends exist not only in Life but throughout the Universe, if only we view the Universe as a huge organism; the difference lying only in the size of the system and in the breadth of the subjective outlook.

¹ Cf. the striking example given by H. Driesch in *The Science and Philosophy of the Organism*. Gifford Lectures (Aberdeen), 1907, pp. 159-161.

With the dawn of life, ends begin to form within individual living organisms. With the dawn of instinct and intelligence, awareness of these ends within individual experience develops, as I have attempted to show earlier in this paper ; and ultimately, with increasing mental complexity, there is not merely this awareness of ends, but finally also distinct awareness that they are ends, and an increasing power to modify and frame fresh ends. This is the subjective, finalistic, intelligent factor which is inseparable from its objective mechanistic analogue, instinct, and develops with it.

I conclude, then, that instincts are not, as has been generally supposed, identifiable with reflexes ; nor are they, as others have urged, a *tertium quid* beside reflexes and intelligence. According to my view and my use of the words, instinct regarded from within becomes intelligence ; intelligence regarded from without becomes instinct.

INSTINCT AND INTELLIGENCE.

A REPLY.

By CHARLES S. MYERS.

*The writer's views restated. Examination of the views of Mr Carr,
Professor Lloyd Morgan, Mr McDougall and Professor Stout.*

IN the following paper I propose to examine the views which my colleagues in the recent symposium have brought forward in relation to my own conception of the connexion between instinct and intelligence.

At the outset I may conveniently restate the position I adopted in my contribution to the symposium. Our notions of instinct are derived from the wonderful effectiveness of the neural prearrangements with which all organisms are to a greater or less extent congenitally endowed, and from the ease of applying a mechanistic explanation to such reactions. But neural prearrangements are likewise present in instances of so-called intelligent activity; for the limits of intelligence are variously fixed in each individual and in each species. The only differences between so-called instinct and so-called intelligence consist objectively in the amount of plasticity and subjectively in the complexity of consciousness. Now save where subsequent reflexion is possible, an organism is never *aware* that it is acting instinctively; intelligent consciousness is always present. There is at least a rudiment of conation and meaning in the exercise of every instinct, and there is a varying amount of plasticity. In every intelligent process, on the other hand, there is a very high degree of congenital plasticity,—a vast number of alternative reactions; but could we know at any moment all the influences at work and fore-know the resultant of those influences, we could with certainty foretell the outcome of intelligent activity subjectively and objectively.

Thus the psychology and physiology of instinct are inseparable from the psychology and physiology of intelligence. There is not one nervous apparatus for instinct and another for intelligence. We ought to speak not of instinct and intelligence but of instinct-intelligence, treating the two as one indivisible mental function which in the course of evolution has approached now nearer to so-called instinct, now nearer to so-called

intelligence. These two terms we must recognize as pure abstractions, relating to different *aspects* of the same mental process, not to different mental *processes*. There is always the mechanistic, and there is always the finalistic, aspect in instinct-intelligence, were we only capable of beholding it. Regarded from the objective standpoint, instinct-intelligence appears as instinct; regarded from the subjective standpoint, it appears as intelligence. The obviousness and complexity of each of these appearances depend on the mental development of the organism which regards and of the organism which is regarded.

Mr Carr takes a diametrically opposite view. He holds, with M. Bergson, that instinct makes use of a consciousness which is totally different from the consciousness of intelligence. He believes that consciousness has attained its highest development in one direction in insects, in another direction in man, and that in man intelligence has reached such a height as practically to obliterate instinct. Evidently then, according to Mr Carr, we can have no conception of the consciousness involved in instinctive behaviour. We are endowing insects with a mental possession, of the nature of which we have not, and never can have, the faintest glimmering. I fail to find in insect life any behaviour which is inexplicable on the hypothesis of a series of reactions, which, although to a large extent fixed, are also plastic and modifiable, involving in their function all the signs of conation and attention.

It has been contended both by M. Bergson and by Mr Carr that intuition is much more nearly allied to what they term the instinctive consciousness than to the intelligent consciousness. Indeed at times they appear to regard intuition as analogous in man to the instincts of lower animals. But surely intuition is only the intelligent consciousness at work without involving the consciousness of the Ego. The product of its activity suddenly comes to the surface, carrying with it, however, no clue as to whence it was derived. It is accompanied by a characteristic experience, an experience perhaps describable as one of uncanny helpfulness from within, but there is nothing either in this concomitant, or in the product, of intuitive activity to distinguish it from intelligent activity. We are apt to underestimate the extent to which we make use of higher unconscious processes in everyday life. Perhaps we are trying to recall something. After vainly employing every kind of mnemonic help, by a curious determination we relegate the recall to the unconscious, and often with an immediate success. Indeed, apart from volitional effort at recollection, all revival is essentially of this "intuitive" nature. So too are many of our judgments and decisions. We hesitate

which of several available courses to adopt, and finally we leave the decision in the hands of the unconscious; we intuitively settle our choice of action. But there is nothing in all this to warrant the belief that a distinct form of consciousness is involved in intuition. As well suppose a distinct form of consciousness to explain the phenomena of post-hypnotic suggestion, multiple personality and the like! It is surely far easier to believe that intelligent activity need not involve the consciousness of the Ego.

If I understand Mr McDougall's present opinions rightly, they differ only slightly from my own. For he admits that intelligent and instinctive processes involve the same fundamental modes of activity, and he accompanies me (nay, in mode of endowment, he goes even further) in endowing instincts with perceptual and conative dispositions. The one and only distinction he draws between instincts and intelligence has reference to the mode and date of origin of such conditioning dispositions. In instinctive activity the dispositions are "wholly or mainly" innate; in intelligent activity they have been formed or have been much modified by previous individual experience. The words "wholly or mainly" make me suspect that Mr McDougall would agree with me that the dispositions conditioning an instinct are never entirely "innate." Further Mr McDougall would almost certainly share my view that the dispositions conditioning intelligent activity are to an enormous extent innate. Consequently he appears to agree with me that in reality instinctive and intelligent behaviour are psychologically indistinguishable.

I turn now to Professor Lloyd Morgan. He believes that instinct and intelligence differ functionally as well as genetically. He holds that in the original exercise of an instinct no meaning is involved, and that instincts only become later modified by the introduction of meaning. Throughout his paper he is vainly endeavouring to get at the beginning, the "primary tissue," as he terms it, of instinctive experience; vainly, because according to my contention there never can be a beginning of experience, —a beginning which has no relation to previous experience. Pure instincts deprived of meaning are like pure sensations deprived of meaning; they are psychological figments. I have sufficiently indicated in my contribution to the symposium how any one instinct must always be associated with some previously active instinct, which has already acquired meaning by association with some previously active instinct, and so on. I may add that I am disposed to accept Mr McDougall's conjecture that, independent of such origin, meaning may come as a congenital endowment to the instinctive process.

Professor Stout agrees with me that an instinct involves no special form of psychical activity, but he reserves the term for those congenital neuro-muscular prearrangements which are accompanied by intelligent consciousness. According to him, it is by virtue of this concomitant intelligence that instinctive activity is sharply divided from reflex. Instinct is thus the resultant of adding to a fixed neural mechanism an intelligent interest in the pursuit of ends. Intelligent consciousness, in other words, involves an independent plastic activity separable from the mechanical system which it controls.

Thus, according to Professor Stout, what is ordinarily called instinct is composed of mechanically prearranged and of intelligent elements; and what is ordinarily called intelligence, he goes on to say, is characterised by the capacity to learn by experience. The essential difference between instinct and intelligence (ordinarily so called) lies, then, in the possession by the former of a prearranged mechanism, by the latter of "instructibility." But "instructibility," the capacity of learning by experience, is now recognized to be an essential feature not only of intelligent but also of instinctive activity, so called. The difference, then, between instinct and intelligence, according to Professor Stout, is that while the former possesses, the latter is devoid of, an innate prearranged mechanism on which intelligence can act. I, on the other hand, prefer to see an innate mechanism and a certain plasticity in both kinds of activity. In what is ordinarily called instinctive behaviour, the innate mechanism is relatively fixed and given; in what is ordinarily called intelligent behaviour, the mechanism is relatively plastic and acquired. But I maintain that such differences are only relative and that no mental state (or process) can be spoken of as solely instinctive or as solely intelligent. It is instinctive *or* intelligent according to the standpoint. Some superhuman being would as surely find our human intelligence determined by mechanism, as we commonly believe the mental activity of animals to be determined by instinct.

On these grounds I protest against erecting one physiological apparatus for instinct and another for intelligence. Indeed how on these lines one could ever account satisfactorily for the first appearance of intelligence passes my comprehension. Nor do I see any reason to adopt Professor Stout's view that instinct once called to its aid intelligence, which thereupon gradually ousted instinct from its place. Throughout the psychical world there is but one physiological mechanism; there is but one psychological function—instinct-intelligence.

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